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AUTHOR Tuckman, Bruce W.; Trimble, Susan
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ABSTRACT

Forty-one middle school students in two eighth-grade classes were taught half of their science chapters in the conventional manner with homework assignments, and half of their chapters by having short classroom quizzes on each unit. Quizzes were expected to stimulate incentive motivation as a mediator between a goal object, mastery, and the responses necessary to attain that objective, effective studying. Quizzes had already proven effective with college students. Chapter mastery was measured by multiple-choice tests accompanying the textbook. Students completed the first five chapters doing homework and the second five doing quizzes, with chapter pairs matched for difficulty across condition in an equivalent time samples design. Results indicated that on the first pair of chapters, students given homework outperformed students given quizzes; on the second and third pairs, there were no differences between conditions; on the fourth and fifth pairs, quizzed students significantly outperformed homework students, the final difference reaching an effect size of almost .50. Based on the findings, it was concluded that regularly-occurring quizzes can become a motivator to study or a stimulator of self-regulatory behavior, even though initially they may not have that effect. (Contains 20 references.) (Author/SD)

Using Tests as a Performance Incentive to Motivate Eighth-Graders to Study

Bruce W. Tuckman

Florida State University

and

Susan Trimble

Georgia State University

Paper Presented at 1997 Annual Meeting of the American Psychological Association, Chicago, IL.

ABSTRACT

Forty-one eighth grade students in two middle-school classes were taught half of their science chapters in the conventional manner with homework assignments, and half of their chapters by having short classroom quizes on each unit. Quizes were expected to stimulate incentive motivation as a mediator between a goal object, mastery, and the responses necessary to attain that objective, effective studying. Quizes had already proven effective with college students. Chapter mastery was measured by multiple-choice tests accompanying the textbook. Students completed the first five chapters doing homework and the second five doing quizes, with chapter pairs matched for difficulty across condition in an equivalent time samples design. On the first pair of chapters, students given homework outperformed students given quizes; on the second and third pairs, there were no differences between conditions; on the fourth and fifth pairs, quized students significantly outperformed homework students, the final difference reaching an effect size of almost .50.

Using Tests as a Performance Incentive to Motivate Eighth-Graders to Study

Current theories of motivation that place their emphasis on the self-system (McCombs & Marzano, 1990) and on self-judgments (Bandura, 1986), have tended to disregard the importance or value of the outcome to the performer. Earlier theories (Vroom, 1964; Atkinson, 1964; Rotter et al., 1972) all emphasized outcome or incentive value as a motivational component, with the possibility that it be either internally or externally based. Current theorists that recognize the value of the outcome to the performer (e.g., Deci & Ryan, 1985; Wigfield & Eccles, 1992), while emphasizing the impact of intrinsically-induced motivation, do see external conditions as potential activators.

Current theories also emphasize the importance of cognitive or text-processing strategies as part of the motivational mix (Pintrich, 1988; Zimmerman, 1989). Some, however, adopt the seemingly implicit assumption that once students have acquired these strategies they will employ them, without necessarily considering whether the learning task they face has sufficient incentive value to motivate them to do this. In other words, the real motivational question may not be whether students know how to deal with a situation, but whether they are inclined to use what they know in dealing with it. The key to answering the second question may well be the determination of how important students regard success on the task to be.

The purpose of the present study was to evaluate a strategy for increasing the potential incentive value of task success without providing an explicit cognitive strategy for performing the task. Incentive value was manipulated by administering or not administering a weekly test or *quiz* on the assigned textbook chapter. Petri (1991) proposed that incentive motivation would lead someone to perform a behavior if it would lead to a desired incentive, and Overmier and Lawry (1979) regard incentive motivation

as a mediator between a goal object and responses necessary to attain that object. If students are motivated to study in order to do well on the chapter tests, and if they possess adequate study skills, then the weekly tests should result in greater learning as reflected on monthly chapter tests. If students lack either motivation or study skills, then the weekly tests should have no effect on subsequent achievement. Since middle-school years are a time when many students seem to lose motivation for school (Eccles et al., 1993), a technique for enhancing motivation during this period would be of great significance.

Pintrich (1988) included outcome importance or value as one of three components of motivation. However, in a study of seventh graders, intrinsic value was not found to have a direct influence on test performance (nor was cognitive strategy use, for that matter; Pintrich & De Groot,1990). In a similar study on college students, outcome value (defined as the importance of getting a high grade) was found to impact test performance (Tuckman, 1993), perhaps reflecting the greater importance of grades in college than in middle school.

In a study of ninth and tenth graders, Zimmerman et al. (1992) found that student grade goals exerted a strong influence on final grades, almost twice as strong as the influence exerted by self-efficacy for academic achievement. In a similar study, Sexton et al. (1992) found that while the influence of self-efficacy on performance was high only at the beginning of the semester, the influence of outcome value was high both at the beginning and the end. Tuckman (1996) found that weekly quizzes led to higher subsequent achievement among college students in an educational psychology course. The question was whether these results would apply equally to eighth-graders.

METHOD

Subjects. Students were 41 eighth-graders in separate classes in the same middle-school, in a small city in the rural part of a Southeastern state. Approximately half of the students were male and half female; about half were Black and half White. Students

were heterogeneous on ability and prior performance, since grouping of students was not used for class assignment.

Materials. Students were all taught science by the same teacher using the same syllabus, textbook, and end-of-chapter tests.

Independent variable. In one of the conditions, *quizzes*, students were given short, seven-item recall tests on each of the four or five subsections of the chapter after each was assigned as homework reading. In the other condition, *no quizzes*, students were given the same reading assignments, but were not immediately tested on them. The no quiz condition was administered on the first five chapters taught, the quiz condition on the second five, to all of the students. There were 10 chapters in all, half taught using quizzes, and half without Chapter pairs were matched on difficulty (1st no quiz/1st quiz: *element 1*, 2nd no quiz/2nd quiz: *element 2*, etc.) to control for chapter difficulty as a variable.

Dependent variable. At the completion of each of the 10 chapters, students were given a multiple-choice test taken from the materials provided to the teacher by the publisher of the textbook. K-R 21 reliabilities were calculated to range between .71 and .80. Scores on these end-of-chapter tests served as the dependent variable of the study.

Design. The research design was a quasi-experimental one in which subjects served as their own controls, also referred to as an equivalent time samples design (Tuckman, 1994). It is also what has been called an ecologically-valid design in that it was done in a natural environment without artificial intrusion.

RESULTS AND DISCUSSION

Because no differences were found between classes, class was not used as a variable in subsequent analysis. A 2 (conditions) x 5 (test; representing chapter pairs or "elements") ANOVA was run with repeated measures on both variables. There was no significant main effect for condition ($F=198.1$, $df=1/40$, $p>.05$), but there was a significant condition x test (or chapter pair) interaction ($F=3.12$, $df=4/160$, $p<.02$). ANOVA results

are shown in Table 1. On the first pair of chapters (Element 1), the students performed significantly better with no quizzes (M=77.1) than with quizzes (M=72.3). On the second and third pairs of chapters (Elements 2 and 3), quizzes or no quizzes made no difference. On the fourth and fifth pairs of chapters (Elements 4 and 5), students performed significantly better with quizzes than without (for pair 4, quiz M=79.1, no quiz M=74.7; for pair 5, quiz M=84.5, no quiz M=77.6). These means are shown in Table 2 and graphically in Figure 1.

Students, therefore, were initially disadvantaged by quizzes, perhaps not taking them seriously enough to study on a daily basis. However, by the fourth and fifth experience, students were increasingly advantaged by quizzes, indicating that they were enhancing the motivation to study. There may be some concern that the quizzes helped students anticipate what would be on the end-of-chapter tests, and therefore constituted specific test preparation. However, the end-of-chapter tests were multiple-choice and focused on conceptual understanding, while the quizzes were completion and focused on factual learning. The purpose of the quizzes was to insure that students read the assignment on a daily basis. Moreover, had the quizzes been nothing more than specific test preparation, they would have yielded superior performance on all chapter pairs, rather than just the fourth and fifth.

There is, of course, the understandable concern that using an external motivator such as tests will have a depressing effect on students' internal motivation. Cameron and Pierce (1994) in a meta-analysis of 96 experimental studies found that, overall, reward did not decrease intrinsic motivation.. Moreover, Harter (1978), in her classic paper on effectance motivation, stated that "the incentive function of reward, coupled with the general informational function signalling what behaviors are important, should direct the child to the development of a system of mastery goals"(p. 48). In other words, tests can be expected to teach students the importance of studying as part of developing a set of

standards for performance. When internalized, these standards or goals become the criteria for the administration of self-reward.

It would appear that regularly-occurring quizzes can become a motivator to study or a stimulator of self-regulatory behavior for eighth-grade students, even though initially they may not have that effect. Given the need to stimulate student motivation in the middle grades (Eccles et al., 1993), middle-school teachers are encouraged to try to activate student self-regulation with quizzes, and not to abandon this approach even if the results, at first, are not what might be desired. Apparently, it takes a little experience with quizzes before eighth-graders take them seriously enough as a performance incentive to adopt self-regulatory strategies, and to expend the effort required to achieve mastery of science.

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FIGURE CAPTION

Figure 1. Test performance as a function of condition (quiz vs. no quiz) and chapter pair (elements 1-5).

Table 1

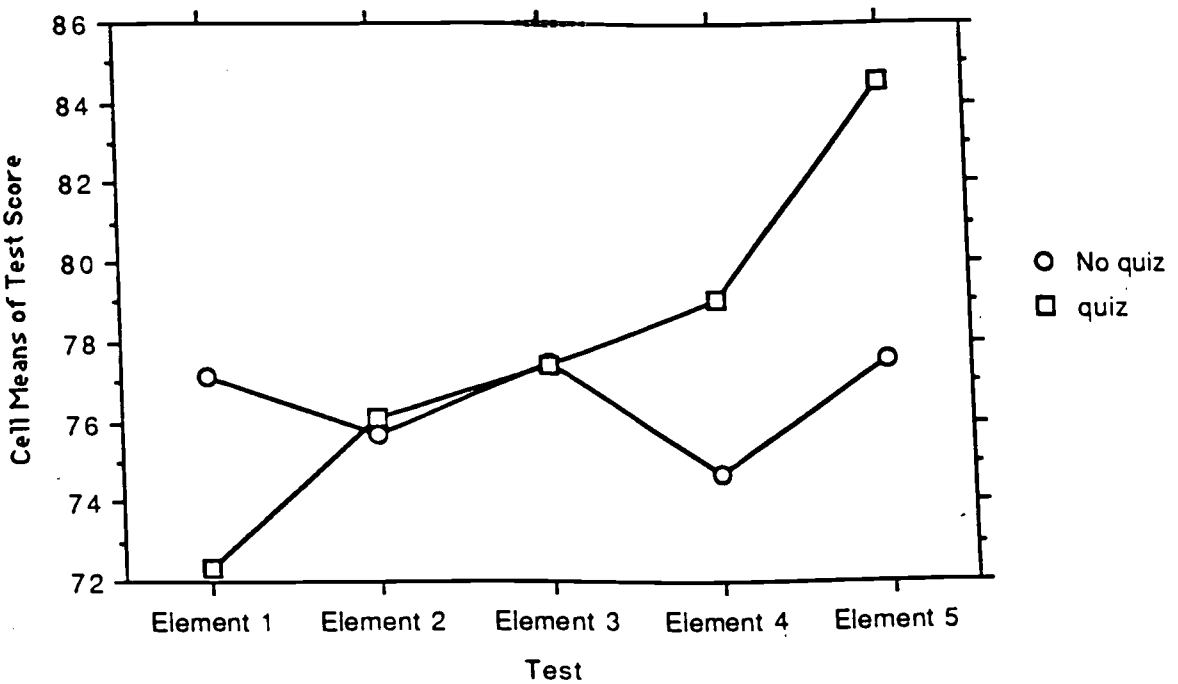
ANOVA of Test Scores as a Function of Condition (quiz vs. no quiz) and Test (or chapter pair:elements 1-5)

Source	df	Sum of Squares	Mean Square	F-Value	P-Value	G-G	H-F
Subject	40	62516.078	1562.902				
Condition	1	198.110	198.110	1.807	.1864	.1864	.1864
Condition * Subj...	40	4384.790	109.620				
Test	4	1869.000	467.250	2.793	.0281	.0364	.0312
Test * Subject	160	26770.800	167.317				
Condition * Test	4	1658.024	414.506	3.124	.0166	.0246	.0206
Condition * Test...	160	21230.576	132.691				

Table 2

Means, Standard Deviations, and Standard Errors by Condition (quiz vs. no quiz) and Chapter Pair (elements 1-5)

	Count	Mean	Std. Dev.	Std. Error
No quiz, Element 1	41	77.122	20.212	3.157
No quiz, Element 2	41	75.659	22.629	3.534
No quiz, Element 3	41	77.512	19.778	3.089
No quiz, Element 4	41	74.683	12.608	1.969
No quiz, Element 5	41	77.585	16.028	2.503
quiz, Element 1	41	72.341	13.230	2.066
quiz, Element 2	41	76.122	12.675	1.980
quiz, Element 3	41	77.439	17.928	2.800
quiz, Element 4	41	79.098	15.310	2.391
quiz, Element 5	41	84.512	15.920	2.486


86
84
82
80
78
76
74
72
Cell Means of Test Score
Element 1
Element 2
Element 3
Element 4
Element 5
Test
No quiz
quiz

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Organization/Address: DEPT. OF EDUC. RESEARCH FLORIDA STATE UNIVERSITY TALLAHASSEE, FL 32306-4453	Telephone: 850-644-8791	FAX: 850-644-8776
	E-Mail Address: tuckman@coe.fsu.edu	Date: 12/30/97

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Jillian Barr Joncas
Assistant Director for Acquisitions and Outreach

School of Education
201 Ferguson Building P.O. Box 26171
University of North Carolina at Greensboro
Greensboro, NC 27402-6171
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910/334.4114
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